INDIAN HEART JOURNAL 68 (2016) S246–S248

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Case Report

Updated cardiac concerns with rituximab use: A growing challenge

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ARTICLE INFO

Article history:
Received 25 August 2015
Accepted 15 October 2015
Available online 20 December 2015

Keywords:
ST elevation myocardial infarction
Coronary artery disease
Right coronary artery
Thrombolysis in myocardial infarction
Percutaneous coronary intervention

ABSTRACT

A 62-year-old male was undergoing treatment of NHL with bone marrow involvement with thrombocytopenia. After 15 min of starting of IV infusion of rituximab, he started having severe retrosternal chest pain, diagnosed as acute ST elevation inferior wall MI. Patient was pre-loaded with dual anti platelets. Coronary angiogram showed 100% occlusion of proximal RCA. Thrombosuction of this culprit RCA revealed underlying 90% stenosis. After that, PCI with balloon angioplasty of RCA was done. The procedure was terminated in the view of successful balloon angioplasty with good TIMI flow. He was kept on dual antiplatelet therapy for one month with regular platelet monitoring. With the growing increasing global use of rituximab for various oncological and immunological diseases, this complication of myocardial infarction should be kept in mind. Associated thrombocytopenia with high thrombus burden in this case heed primary coronary balloon angioplasty without stent placement a more suitable modality.

1. Introduction

As the use of monoclonal antibodies are increasing globally in various forms of malignancies and autoimmune diseases, we recommend that patients with known cardiovascular risk factors should be assessed for ischemic heart disease before treatment and be carefully monitored during and after treatment especially during first infusion when tumor burden is highest with a slow initial infusion rate, followed by increasing the rate in 30-minute increments as tolerated.[1] This life-threatening cardiovascular complication should also be kept in mind while using rituximab in patients without cardiovascular risk factors. Patients receiving rituximab need to be carefully monitored during infusion and any signs and symptoms or hemodynamic derangement pertaining to cardiovascular origin should be discussed with cardiac physician. Any chest pain while on infusion of rituximab warrants ECG and consultation with cardiac physician.

2. Case report

A 62-year-old male was admitted in cancer center of institute of our hospital for treatment of NHL with bone marrow involvement with thrombocytopenia (platelet count ~64,000/cmm). He was in stage IV with no B symptoms. Histopathology and immunohistochemistry revealed diffuse large B cell lymphoma with CD20, CD10 positive, and Tdt negative CD3-stained structure lymphocytes with increased ki67. IV infusion

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http://dx.doi.org/10.1016/j.ihj.2015.10.374

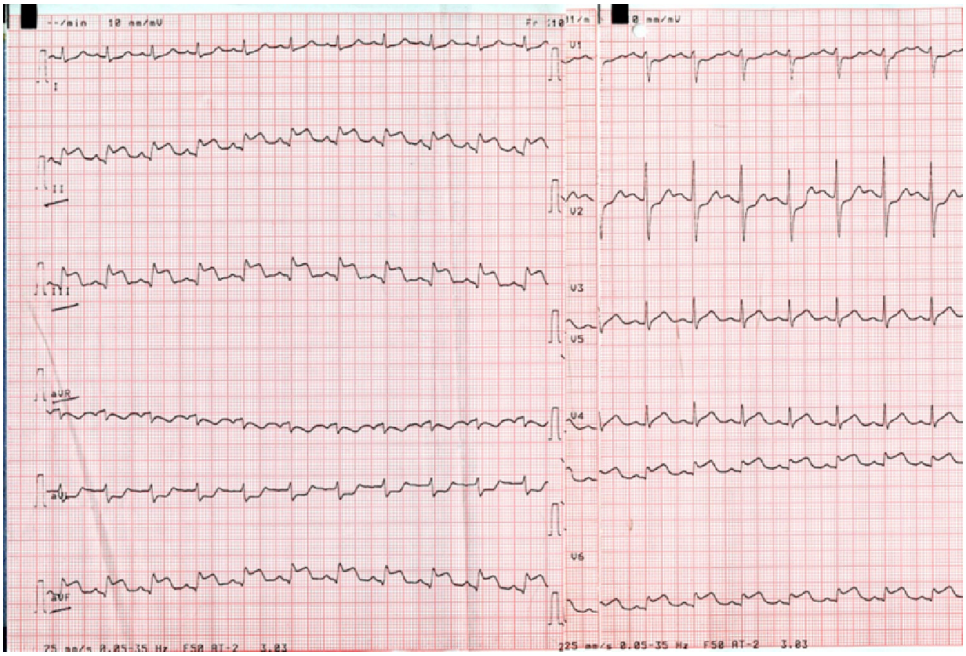

Fig. 1 – Electrocardiogram during chest pain ST elevation suggestive of acute inferior wall MI.

of Rituximab was started. After about 15 min, he started having sudden onset of severe retrosternal chest pain with sweating and perspiration which did not subside even after stopping rituximab infusion and administration with sublingual nitrates. Immediately, 12 lead ECG (Fig. 1) was taken which showed ST elevation in II, III aVf, V5, and V6.

His blood pressure was 100/70 and HR was 98/min. The echocardiography revealed hypokinesia of inferior wall of LV, LVEF ~40 to 45% without any pericardial effusion, MR, or VSR. The patient was loaded with 325 mg of aspirin and 60 mg of Prasugrel with the clinical prediction of primary angioplasty of right coronary artery. Coronary angiogram showed 100% occlusion of proximal RCA (Fig. 2) with tight 90% stenosis in nondominant proximal LCx with plaque in proximal LAD.

Thrombosuction revealed 90% stenosis of about 15 mm length (Fig. 3a) which was dilated with balloons of 1.5 mm, 2.0 mm, 2.5 mm, and 3.0 mm.

The procedure was terminated here in the view of successful POBA with about 20–30% residual stenosis (Fig. 3b) with good TIMI flow without any underlying dissection or residual thrombus and underlying clinical scenario. Chest pain of patient resolved with POBA. He was discharged from the hospital 4 days post-procedure without any complications with platelet count of 1 lakh 7 thousand on dual ant platelet therapy for one month with regular platelet monitoring.

Fig. 2 – Selective right coronary angiogram showing 100% occluded proximal right coronary artery.

3. Discussion

Rituximab is a chimeric monoclonal antibody that targets the B-cell CD20 antigen and causes rapid and specific B-cell depletion. Biologic and chemotherapeutic agents are associated with a risk of infusion-related toxicity.[2] The mechanism by which rituximab elicits infusion reactions remains unclear, although the symptoms associated with the reactions are thought to be related to the release of inflammatory cytokines.[3] The incidence of infusion reactions was highest during the first infusion (77%) and decreased with each subsequent infusion.[1] Adverse events can include urticaria, hypotension, angioedema, hypoxia, pulmonary infiltrates, acute respiratory distress syndrome, myocardial infarction, ventricular fibrillation, or cardiogenic shock. The majority of severe reactions occur approximately 30–120 min after starting the first infusion.[1]

There are cases described in the literature,[4] but our case is having certain salient and distinguishing features. Our case

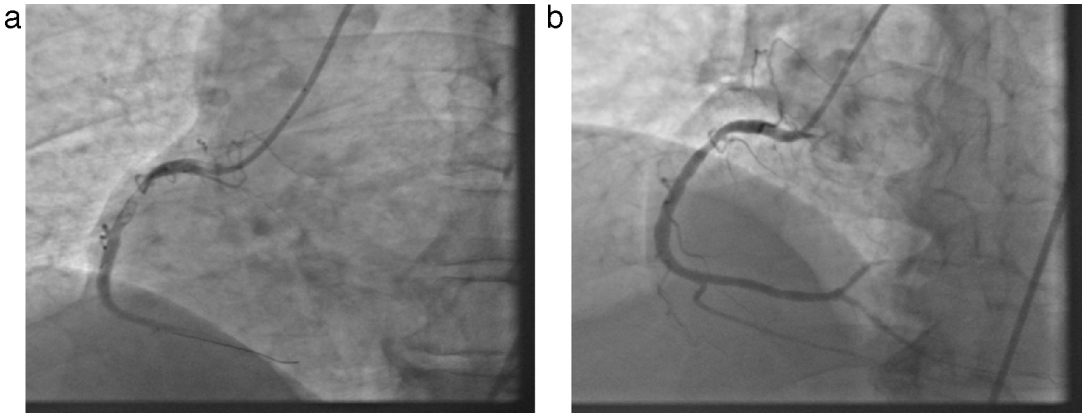

Fig. 3 – (a) Flow established in right coronary artery after use of thrombosuction catheter during primary PCI. (b) Final result of right coronary artery after successful balloon angioplasty.

developed acute STEMI in the oncology department of PCI-capable institute and the door-to-balloon time was around 40 min. There was baseline thrombocytopenia. Because of these reasons, we preferred primary angioplasty over pharmacological thrombolysis. We preloaded the patient with Aspirin and Prasugrel. Although the patient was having evidence of underlying coronary artery disease in the coronary angiogram, he gave no past history of CAD. The current pathophysiological infract-related lesion was 100% thrombotic occlusion of proximal RCA, the LCx was also showing evidence of established CAD. After the thrombosuction of RCA lesion, POBA of RCA showed minimal residual stenosis. Fortunately, we did not come across any coronary dissection[5] with our POBA results and we deferred the stenting in the view of thrombocytopenia and need for long-term DAPT.

The proposed mechanism of rituximab induced myocardial infarction could be release of cytokines following death of B cells that leads to platelet activation, vasoconstriction, and plaque rupture. The risk could be more in patients with pre-existing atherosclerosis and vulnerable plaques and advance stage malignancy. Adequate hydration prior to starting chemotherapy with rituximab (especially with first dose infusion) might be a preventive strategy as our case revealed a lot of thrombus burden in the present case. Additionally, while treating these patients with percutaneous coronary intervention, complication of coronary dissection should be kept in mind.[5] Special devices that are helpful while dealing with high thrombus burden lesions (e.g. thrombus aspiration catheter and protection devices) should also be kept ready.

Conflicts of interest

The author has none to declare.

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